

Amendments to the Claims

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) Cooling apparatus comprising:

a removable cryogenic refrigerator; and

a thermal interface between the removable cryogenic refrigerator and a cryogen vessel to be cooled by the cryogenic refrigerator; wherein,

the thermal interface is a non-contact thermal interface between a cooling stage of the refrigerator and a base of a closed recondensing chamber and consists of a gas held in thermal contact with ~~[[a]]~~ the cooling stage surface of the refrigerator, and the base of the ~~within a~~ closed recondensing chamber;

the cryogen vessel is cooled by thermal conduction through the base ~~a wall~~ of the closed recondensing chamber; and

the cooling stage does not make mechanical contact with the base of the closed recondensing chamber. ~~the thermal interface is the exclusive thermal interface between the refrigerator and the wall of the closed recondensing chamber.~~
2. (Previously Presented) Cooling apparatus according to claim 1 wherein the cryogenic refrigerator is mounted within a sleeve, and the volume within the sleeve surrounding the refrigerator forms the closed recondensing chamber.

3. (Currently Amended) Cooling apparatus according to claim 1, wherein the gas condenses to a liquid on the cooling stage surface and falls under gravity into contact with the base wall of the closed recondensing chamber.
4. (Currently Amended) Cooling apparatus according to claim 1, wherein the base wall of the closed recondensing chamber is in thermal contact with a further recondensing chamber, arranged for the recondensation of a cryogen gas and sealed from the closed recondensing chamber of the thermal interface.
5. (Currently Amended) Cooling apparatus according to claim 1, wherein the cooling stage surface is provided with fins.
6. (Previously Presented) A cryostat comprising the cryogen vessel containing a liquefied cryogen, and comprising a recondenser exposed to the interior of the cryogen vessel, the recondenser being connected for cooling by the cooling apparatus according to claim 1.
7. (Original) An MRI system comprising superconducting windings contained within a cryostat as claimed in claim 6.

8. (Currently Amended) A thermal interface, comprising a closed recondensing chamber that is disposed around a recondensing refrigerator and is in thermal contact with a cryogen vessel that is to be cooled, through a base wall of the closed recondensing chamber; wherein:

the closed recondensing chamber is filled with a gas which is recondensed into a liquid by the recondensing refrigerator, wherein thermal contact between the recondensing refrigerator and the cryogen vessel is provided by recondensation of the gas and through the base wall of the closed recondensing chamber and the thermal interface is a non-contact thermal interface between a cooling stage of the refrigerator and a base of a closed chamber, and the cooling stage does not make mechanical contact with the base of the closed recondensing chamber. the exclusive thermal interface between the refrigerator and the wall of the closed recondensing chamber.

9. (Previously Presented) A method for recondensing a cryogen gas within a cryostat comprising the steps of:

providing a recondensing surface exposed to the cryogen gas within the cryostat and arranged in thermal contact with a wall of a closed recondensing chamber of a thermal interface as recited in claim 8; and

cooling the recondensing surface by cooling the component through the wall of the closed recondensing chamber of the thermal interface.

Claim 10. (Cancelled)

11. (Currently Amended) A cooling apparatus comprising:

a cryogenic refrigerator;

a thermal interface that is in thermal contact with a cooling stage ~~component~~ of the refrigerator, and with a cryogen vessel that is to be cooled; wherein

said thermal interface comprises a closed recondensing chamber, at least a portion of which is in thermal contact with said cooling stage ~~component~~ of the refrigerator;

the closed recondensing chamber is filled with a cryogen gas, and is separated and sealed from a cryogen fluid contained in the cryogen vessel, by a base of the closed recondensing chamber wall that is in thermal contact with said cryogen fluid in said cryogen vessel;

said recondensing chamber is configured such that, in an operating state, gas that is liquefied in said recondensing chamber accumulates adjacent said base ~~wall~~ and is boiled off by heat transferred from gaseous cryogen fluid in said cryogen vessel; and

the cooling stage does not make mechanical contact with the base of the closed recondensing chamber. ~~the thermal interface is the exclusive thermal interface between the refrigerator and the wall.~~

12. (Currently Amended) A cryogenic cooling apparatus comprising:
- a cryogenic refrigerator;
 - a first recondensing chamber that is filled with a gas and is in thermal contact with a cooling stage component of said cryogenic refrigerator;
 - a second recondensing chamber that is in thermal contact with a base of said first recondensing chamber and with a cryogen vessel that is to be cooled; wherein,
 - said first recondensing chamber is separated from said second recondensing chamber by said base ~~a common structural component~~ which forms a heat transfer path between said first and second recondensing chambers, and which seals and isolates said first recondensing chamber from said second recondensing chamber;
 - said second recondensing chamber is in thermal contact with a cryogenic fluid in said cryogen vessel; and
 - said gas in said first recondensing chamber forms a non-contact thermal interface between said cooling stage and said base, wherein said cooling stage does not make mechanical contact with said base. ~~the gas filling the first recondensing chamber is the exclusive thermal interface between the cryogenic refrigerator and the second recondensing chamber.~~

13. (Previously Presented) The cryogenic cooling apparatus according to Claim 12, wherein said second recondensing chamber is in fluid communication with cryogenic fluid that is contained in an interior of said cryogen vessel.